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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/632,322	08/01/2003	Munenori Oizumi	TI-35909	5221

23494   7590   11/24/2008
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EXAMINER
ROSARIO, DENNIS

ART UNIT	PAPER NUMBER
2624	

NOTIFICATION DATE	DELIVERY MODE
11/24/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

uspto@ti.com

	Application No.	Applicant(s)
Office Action Summary	10/632,322	OIZUMI ET AL.
	Examiner	Art Unit	
	Dennis Rosario	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS,
WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>08 August 2008</u>.

2a)☒ This action is FINAL.   2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-5</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-5</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>4/9/07</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____

5)☐ Notice of Informal Patent Application

6)☐ Other: _____.

DETAILED ACTION

Response to Amendment

1.   The amendment was received on 8/8/08. Claims 1-5 are pending.

Response to Arguments

2.   Applicant's arguments filed 8/8/08 have been fully considered but they are not

persuasive.

Applicants state that each of Kim, Muzilla or Jensen does not suggest or show a

motivation for modifying or combing each of Kim, Muzilla or Jensen and there is

no evidence of a reasonable expectation of success in the references. The

examiner respectfully disagrees since Kim teaches an averaging filter as shown

in fig. 16 and fig. 2:114 with no specific details of the inside of the filter and a

typical way of computing an autocorrelation as discussed in col. 1, lines 43-50.

Thus, Kim suggests to at least finding a detailed teaching of the averaging filter

and suggests that there other ways of computing the autocorrelation other than

the typical way. So, Muzilla enters and provides a detailed median filter which is

the same as an averaging filter of which specific details are shown in figures 11

and 12. Where such a median filter has a down stream interpolation as shown in

fig. 9:124A and B. Note that the median filter resides numeral 126B of fig. 9.

Thus, there is a reasonable expectation of success since Kim's filter and

Muzilla's filters are the same and provide an average value where Muzilla's

filter's output of an average is being enhanced with said interpolation. In addition,

Jensen enters teaching that there are "traditional" in col. 2, lines 6-10 and "new"

in col. 1, lines 15-19 ways of computing autocorrelation. There is a reasonable

expectation of success since both Kim and Jensen teach traditional

autocorrelation to obtain a velocity and Jensen provides a new method of

computing autocorrelation that modifies the traditional autocorrelation's "lag" in

col. 2, lines 6-10. Thus, It would have been obvious at the time the invention was

made to one of ordinary skill in the art to modify Kim with Muzilla and Jensen for

the same reasons as claim 1 in the office action of 6/10/08 of which is

reproduced, below.

Claim Rejections - 35 USC § 103

3.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

4.   Claims 1 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Kim et al. (US Patent 5,653,234) in view of Muzilla et al. (US Patent 5,735,797) further

in view of Jensen (US Patent 6,859,659 B1).

Regarding claim 1, Kim teaches a method of image filtering, comprising:

(a)   computing an autocorrelation (fig. 2, num. 108) in a single direction (or "same direction" in col. 1, lines 43-50) for each pixel (represented in equation (1) as "x" of column 1: "pixels" in col. 4, lines 14-16) in an image (fig. 2: I and Q);

(b)   filtering (fig. 2, num. 114) said image with a lowpass filter (fig. 2, num. 114 is a "lowpass filter": abstract), wherein said filtering (fig. 2, num. 114) adaptively changes (corresponding to "adjustable pass band": abstract) according to (or based on) the auto-correlation (fig. 2 ,num. 108); and

(c)   interpolating (fig. 2:114 outputs an averaged image as indicated in fig. 1:AVERAGED SIGNAL where averaging is a form of interpolating) said image (fig. 2: I and Q) and said filtered image from step (b) (Kim does not disclose interpolating said filtered image from step (b)) wherein said interpolating (fig. 2, num. 114) at said each pixel depends upon (or based on) said autocorrelation (fig. 2, num. 108) in said (same) single direction.

Kim does not teach the claimed:

a)   modified autocorrelation and

b)   interpolating said filtered image from step (b).

Instead, Kim teaches autocorrelation that is "typically":col. 1, lines 41-50 computed according to said equation (1) and teaches and ARCTAN function in fig. 2, num. 116 following a filtered image upon the output of fig. 2, num. 114 to obtain a velocity measure.

Regarding the claimed interpolating said filtered image from step (b), Muzilla teaches interpolating as shown in fig. 9. num. 124A said filtered image from step (b) represented in fig. 9 as num. 126A: a detailed view in fig. 10 that shows an adaptive filter 136 and 138 which generates the claimed filtered image from step (b) that is subsequently interpolated in fig. 9, num. 124A.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify Kim's filtered image of fig. 2, num. 114 of obtaining a velocity measure with Muzilla's teaching of obtaining a velocity measure represented in Muzilla in fig. 9 as VELDATA based on interpolating in fig. 9, num. 124A, because Muzilla's teaching provides a visual display of flow data such as velocity instead of just obtaining velocity as done in Kim. Thus, Muzilla enhances Kim calculation of velocity visually.

The combination still does not teach the claimed modified autocorrelation, but Kim of the combination states that a typical autocorrelation computation is used to obtain a velocity.

Jensen teaches "traditional autocorrelation" in col. 2, lines 5-10 and "standard autocorrelation" in col. 4, lines 46-48 and teaches "a new autocorrelation estimator" in col. 1, lines 15-19, which is the claimed modified autocorrelation, because the new autocorrelation estimator modifies the traditional autocorrelation by introducing equation (26) in column 6 which are used with the traditional autocorrelation equations (24) and (25) in column 5 as discussed in col. 6, lines 6-16.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify Kim's typical autocorrelation with Jensen's teaching of traditional

autocorrelation with the new autocorrelation, because Jensen's new autocorrelation is

"new and improved" in col. 1, lines 60-63.

Regarding claim 5, Muzilla of the combination teaches:

(a)   said image is a color channel of a color image ("color map" in abstract).

5.   Claims 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et

al. (US Patent 5,653,234) in view of Muzilla et al. (US Patent 5,735,797) further in view

of Jensen (US Patent 6,859,659 B1) or Jensen I further in view of Jensen (A New

Method for Estimation of Velocity Vectors) or Jensen II.

Regarding claim 2, Kim teaches with said image (said I and Q of fig. 2) of step (c)

replaced by said interpolated image (upon the output of fig. 2, num. 114) using said

modified auto-correlation in said single direction and does not teach the remaining

limitations of claim 2 and instead uses the same direction for correlation "for any given

direction" in col. 1, lines 20-24.

Jensen of the combination teaches axial and transverse directions determined

from autocorrelation functions: column 5: equations (24) and (25) which is an

improvement of the prior art as discussed in col. 1, lines 60-63 and the method of claim

1, further comprising:

(a)   a single direction (or axial direction) replaced (during estimation of a

"Velocity transverse" in col. 2, lines 44-46 that cannot use the axial direction and a

transverse direction must be used, thus replacing the axial direction with a transverse

direction during estimation of the transverse direction) by a second direction (as shown

by any one of transverse arrows of fig. 1), said second direction perpendicular (as show

in fig. 4 that shows axes that are perpendicular) to said single direction (axial direction).

It would have been obvious at the time the invention was made to one of ordinary

skill in the art to modify Kim's teaching of autocorrelation at any given direction with

Jensen's teaching of axial and transverse directions which would result in the claimed

repeating of clam 1 the only difference being a perpendicular direction, because Jensen

has identified a "common problem" (Jensen II, page 837, left column) with ultrasound to

measure velocity and provides a solution.

6.   Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over

Kim et al. (US Patent 5,653,234) in view of Muzilla et al. (US Patent 5,735,797) further

in view of Jensen (US Patent 6,859,659 B1) further in view of Kim et al. (US Patent

5,544,658).

Regarding clam 3, Jensen provides standard autocorrelation and modifies the

standard autocorrelation as discussed in claim 1, above.

Kim teaches "modified auto correlation" in col. 3, line 17 and claim 3 of

(a)   said modified auto-correlation ("modified auto correlation" in col. 3, line 17)

of step (a) of claim 1 is $Rxx(1)/(Rxx(0) + \delta)$ (see equation "(1)" in column 3 and equation

(9) in column 8) where $Rxx(.)$ is the auto-correlation function for the pixel values in an

interval about said each pixel and with the DC component removed (via fig. 5, num. 34),

and where δ is a parameter (or "variables" in col. 8, line 22).

It would have been obvious at the time the invention was made to one of ordinary

skill in the art to modify Jensen's teaching of auto-correlation with Kim's teaching of the

modified auto-correlation, because Kim's modified auto-correlation remedies the

deficiencies of auto-correlation with respect to "aliasing" in col. 3, line 9 or noise.

7.   Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over

Kim et al. (US Patent 5,653,234) in view of Muzilla et al. (US Patent 5,735,797) further

in view of Jensen (US Patent 6,859,659 B1) further in view of Kim et al. (US Patent

5,544,658) as applied in claim 3, above, further in view of Hall et al. (US Patent

5,363,851).

        Regarding claim 4, the combination does not teach claim 4, but Jensen teaches

modifying autocorrelation as discussed in claim 1, above.

        Hall teaches a modified auto-correlation as shown in fig. 4, num. 60 and claim 4

of:

        a)   Rxx(1)/(Rxx(0) + δ) (as shown in fig. 4,num. 60) exceeds a threshold (fig.

4,num. 68).

        It would have been obvious at the time the invention was made to one of ordinary

skill in the art to modify Jensen's teaching of auto-correlation with Hall's modified auto-

correlation and threshold, because Hall teaching provides "accurate velocity estimation"

in col. 2, line 12.

Conclusion

8.   **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time

policy as set forth in 37 CFR 1.136(a).

        A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later

than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Dennis Rosario whose telephone number is (571) 272-

7397. The examiner can normally be reached on 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Matthew Bella can be reached on (571) 272-7778. The fax phone number

for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the

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system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Dennis Rosario/
Examiner, Art Unit 2624

/Matthew C Bella/
Supervisory Patent Examiner, Art Unit 2624